Table 1.
Categories of Targeted Benefits by Sub-Region

Targeted Benefits will be achieved by altering flow paths of irrigated agriculture.

Region		Sub-Region	Abbreviated Categories of Targeted Benefits*											
				Quality							Quantity			
			Flow / Timing	Nutrients	Group A Pesticides	Pesticides	Salinity	Native Constituents	Temperatures	Sediments	Long-Term Diversion Fleüibility	Nonproductive Evaporation	Short-Term Diversion Fleüibility	Flows to Salt Sinks
Sacramento Valley	1	Redding Basin	✔								✔	✔		
	2	Sacramento Valley, Chico Landing to Red Bluff	✔			✔			✔		✔	✔		
	3	Sacramento Valley, Colusa Basin	✔		✔	✔	✔				✔	✔		
	4	Mid-Sacramento Valley, Chico Landing to Knights Landing	✔			✔	✔				✔	✔		
	5	Lower Feather River and Yuba River	✔		✔	✔	✔		✔		✔	✔		
	6	Sacramento Valley Floor, Cache Creek, Putah Creek, and Yolo Bypass	✔			✔					✔	✔		
	7	Lower Sacramento River below Verona	✔			✔	✔		✔		✔	✔		
Delta & Tributary	8	Valley Floor east of Delta	✔						✔		✔	✔		
	9	Sacramento - San Joaquin Delta	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔
West Side SJ Valley	10	Valley Floor west of San Joaquin River	✔		✔	✔	✔	✔		✔	✔	✔		✔
East Side SJ Valley	11	Eastern San Joaquin Valley above Tuolomne River	✔	✔	✔	✔	✔		✔		✔	✔		
	12	Eastern Valley Floor between Merced and Tuolomne Rivers	✔		✔	✔	✔		✔		✔	✔		
	13	Eastern Valley Floor between San Joaquin and Merced Rivers	✔		✔	✔	✔		✔		✔	✔		
West Side SJ Valley	14	Westlands Area				✔					✔	✔		✔
Southern SJ Valley	15	Mid-Valley Area									✔	✔		✔
	16	Fresno Area	✔		✔	✔	✔		✔		✔	✔		
	17	Kings River Area									✔	✔		✔
	18	Kaweah and Tule River Area									✔	✔		✔
	19	Western Kern County									✔	✔		✔
	20	Eastern Kern County									✔	✔		
	21	Kern River Area									✔	✔		✔

✔ represents 1 or more TB

* Definitions of Targeted Benefit Categories are presented in Table 2.

Table 2. Definition of Targeted Benefit Categories

Abbreviated Category	Definition
Flow / Timing	Provide flow to improve ecosystem conditions
Nutrients	Reduce nutrients to enhance and maintain beneficial uses of water (Eco, Ag, M&I)
Group A Pesticides	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water (Eco, Ag, M&I)
Pesticides	Reduce pesticides to enhance and maintain beneficial uses of water (Eco, Ag, M&I)
Salinity	Reduce salinity to enhance and maintain beneficial uses of water(Eco, Ag & M&I)
Native Constituents	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water (Eco, Ag & M&I)
Temperatures	Reduce temperatures to enhance and maintain aquatic species populations
Sediments	Reduce sediments to enhance and maintain beneficial uses of water (Eco, Ag, M&I)
Long-Term Diversion Fl	Provide long term diversion flexibility to increase the water supply for beneficial uses (Eco, Ag, M&I)
Nonproductive Evaporati	Decrease nonproductive evaporation and transpiration to increase the water supply for beneficial uses (Eco, Ag, M&I)
Short-Term Diversion Fl	Provide short-term diversion flexibility to make water available to the Environmental Water Account in a timely
Flows to Salt Sinks	Decrease flows to salt sinks to increase the water supply for beneficial uses (Eco, Ag, M&I)

III. Explanation and Examples of Quantifiable Objectives

The following draft tables and figures are provided as illustrative examples of the format that will be used to report all 199 Targeted Benefits and their associated Quantifiable Objectives. The following are an incomplete set of Figures 11.1 through 11.3 and Tables 11.1 through 11.5, describing the Flow Paths, Targeted Benefits, and Quantifiable Objectives for Sub-Region 11. When completed, this document will contain completed figures and tables for all 21 Sub-Regions that comprise the Central Valley. Tables 11.1 through 11.3 provide a complete listing of the 16 Targeted Benefits for Sub-Region 11. However, Tables 11.4 and 11.5 only provide description of three of the 16 Quantifiable Objectives associated with the Targeted Benefits because other Quantifiable Objectives have not yet been defined.

There are three categories of Ag WUE Targeted Benefits:

- Streamflow and Timing: providing more that provide more flow along a given river segment to meet specified needs, at a specific time (such as fish spawning)

- Water Quality: improving water quality by lessening the load of harmful contaminants, providing greater oxygenation, reducing silt, etc.
-
- Water Quantity: increasing available water resources by reducing irrecoverable flows, such as evaportranspiration, or enabling flexibility in water diversion (such as groundwater conjunctive use).

Table 11.1 Descriptive Lists of Targeted Benefits

Table 11.1 describes each Targeted Benefit including geographic location, probable beneficiary, timing, and availability of quantitative data and conceptual completeness. The Targeted Benefits have been made as specific as possible, but where specificity is not available, or not possible, an explanation is given. The primary sources for the Targeted Benefits include CALFED's Ecosystem Restoration Program Plan (ERPP), the State Water Resources Control Board 303(d) list of impaired water bodies, and discussions with Agriculture Water Use Efficiency Senior Technical Advisors.

Column (1), TB#: is an index used to uniquely identify each Sub-Region's Targeted Benefit. Some Targeted Benefits span more than one Sub-Region. Where these multi-Sub-Region Targeted Benefits occur, the TB number of the corresponding identical Targeted Benefit is listed in brackets. For example, the Targeted Benefit given as TB #112 (Provide flow to improve aquatic ecosystem conditions in the San Joaquin River) spans three other Sub-Regions and is repeated as TBs 131, 148, 171.

Column (2), Location: refers to the specific place that a Targeted Benefit applies. For example Row #123 refers to the San Joaquin River at Vernalis. If the location refers to a water body such as Stanislaus River (TB #113) without additional specificity, then the Targeted Benefit applies to the entire water body (see Table 11.1).

Column (3), Category of Targeted Benefits: is provided for context and to allow the list of Targeted Benefits to be sorted by category.

Column (4), Beneficiary: is the intended recipient of the benefits of the given Targeted Benefit. The codes for the three beneficiaries are as follows:

- **Eco:** the ecosystem (fish flows, wetlands, etc.),
- **Ag:** agriculture (water quality, water supply), and
- **M&I:** municipal and industrial users (water quality and water supply).

Column (5), General Time-Frame: identifies the general time, either type of year or time of year that a change in flow, water quality, or quantity is needed to achieve the Targeted Benefit in order to have the intended affect on the beneficiary.

Column (6), Conceptual Completeness: describes our understanding of the cause and effect relationship between the Targeted Benefit in quantifiable water flow, timing, or quality terms, and intended effect on the beneficiary. The primary source used to assign the Conceptual Completeness ratings for the ecosystem-related Targeted Benefits was CALFED's Ecosystem Restoration Program Plan. The Conceptual Completeness sources for the other Targeted Benefits were the best available data and judgment. The following three categories were used to describe the different levels of Conceptual Completeness:

1) **Complete:** the relationship between cause and effect is well known and achievement of the Targeted Benefit will result in the desired affect on the beneficiary. For example, for TB #127, see Table 11.1, (Decrease nonproductive ET to increase water supply for beneficial uses), we are confident that reducing evaporative losses will reduce irrecoverable losses and increase the amount of water available for beneficial uses.

2) **Incomplete:** the conceptual linkage between Targeted Benefit and the intended beneficiary has been established, but the cause and effect is not fully understood. For example, TB #113, see Table 11.1, (Provide flow to improve aquatic ecosystem conditions in the Stanislaus River) is conceptually incomplete because the fisheries specialists are confident that improved flows will lead to improved aquatic ecosystems, but they are uncertain of the correlation between the amount of flow and the extent of ecosystem improvement.

3) **Undefined:** indicates that additional research and evaluation are required before a conceptual link can be made between the Targeted Benefit and the desired affect on the beneficiary.

Table 11.2 Quantified Targeted Benefits

Table 11.2 provides the source and description of each Quantified Targeted Benefit (QTB) associated with Sub-Region 11. The QTB expresses the target in language that describes the desired condition in flow/timing, quality, or quantity terms assumed to be necessary to achieve the Targeted Benefit, given the current level of scientific understanding. (This is the level of understanding between the desired Targeted Benefit and the necessary quantified conditions in water flow, quality, or quantity terms to achieve it.)

Column (1), Row#: is the same unique TB # used in all Tables.

Column (7), Source and Description of Quantified Targeted Benefit: provides the citation and text upon which the QTB is based. For example, TB #113 (Provide flow to improve aquatic ecosystem conditions in the Stanislaus River) was derived from the ERPP through text that seeks to, "maintain specified follow regimes: for example, provide the base flows in the Stanisluas River below Goodwin Dam in critical, dry, and below-normal years, minimum flows should be 200 to 300 cfs, except for a flow event of 1,500 cfs for 30 days in April and May." In addition, the Core team suggests that there is a "...10 day October flow event of 1500 cfs." The following citation codes are used in this Column 7 and Column 8 (Tables 1.3 through 21.3):

4) **Calculated:** the given value is computed

5) **Change given:** the Quantified Targeted Benefit Change

6) **Core**: Ag WUE senior technical advisors: Regional Liaisons, Water Supply, Water Quality, and Biologists (personal communications, 1999 - 2000)

7) **CVGSM**: Output or input data from the CVGSM (CVPIA PEIS, 1999)

8) **CVHJVIP:** Central Valley Habitat Joint Venture Implementation Plan, April 19, 1990 (CVHJVIP)

9) **ERPP**: Draft Ecosystem Restoration Program Plan (June, 1999)

10) **NA:** Data not available or not applicable

11) **RWQCB:** Regional Water Quality Control Board

12) **RWS (ICP):** Refuge Water Supply Interagency Cooperative Program (1998)

13) **TBD:** To be determined

14) **303(d)**: List of Impaired Water Bodies, 303(d) (State Water Resources Control Board, 1999)